Submarine Mine Countermeasures

Presented by

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4 November 99

Outline

→**MCM Performance**

- **Submarine MCM**
- **MCM Common Operational Picture (MCM COP)**
- **Summary**

Mine Countermeasures

Purpose: **Allow timely access to areas potentially denied by mines.**

Why emphasize Mine Hunting?

- **Allows Mine Avoidance if possible.**
- **Enables Mine Neutralization if necessary.**

Elements of Successful Mine Hunting:

- **High area coverage rate.**
- **High probability of finding and calling a mine a mine.**
- **Low probability of calling a non-mine a mine.**

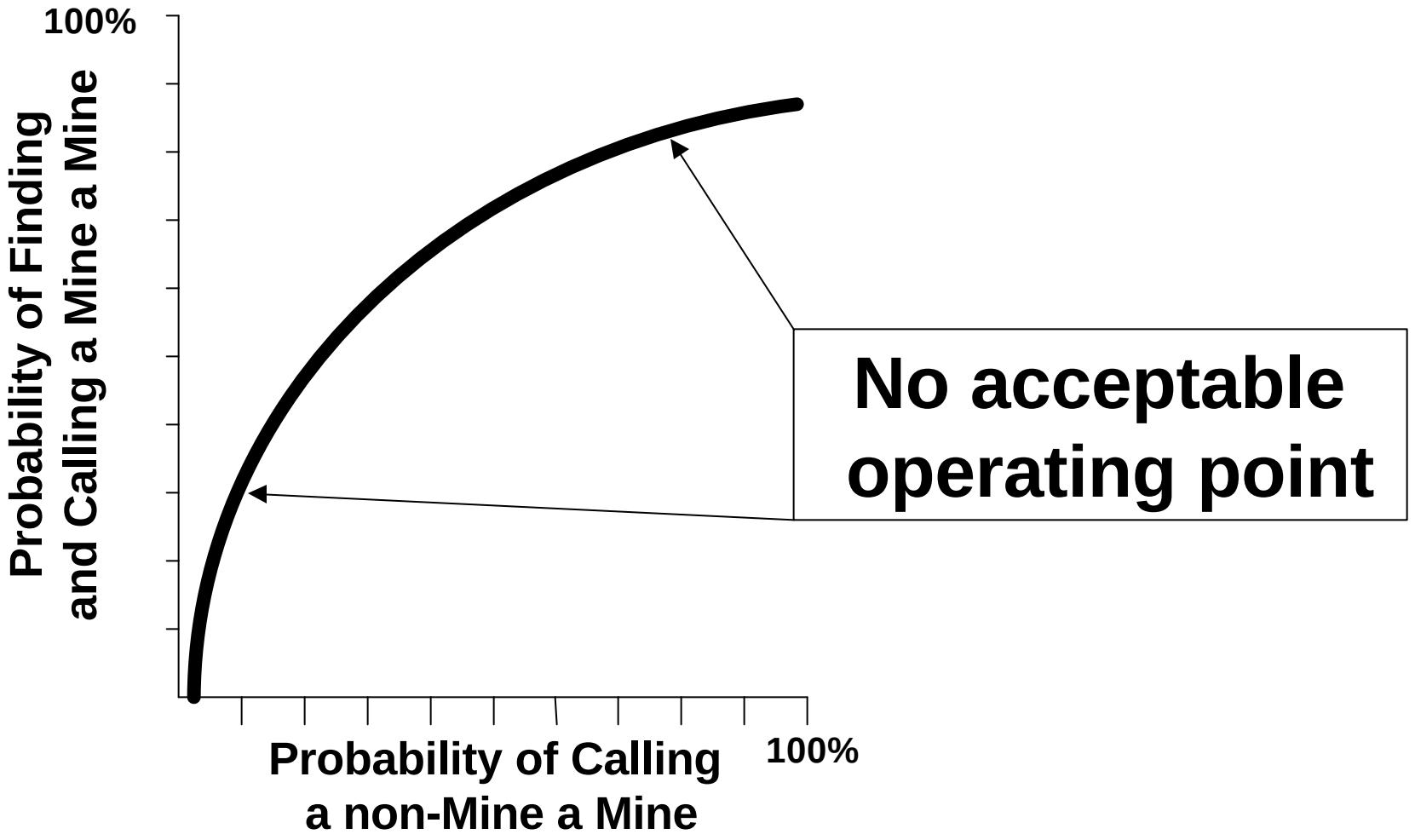
How to Reduce the Timeline?

- **Maximize the area coverage rate <u>without</u> sacrificing the ability to differentiate between a mine and a non-mine (increase the speed of advance, swath size or both).**

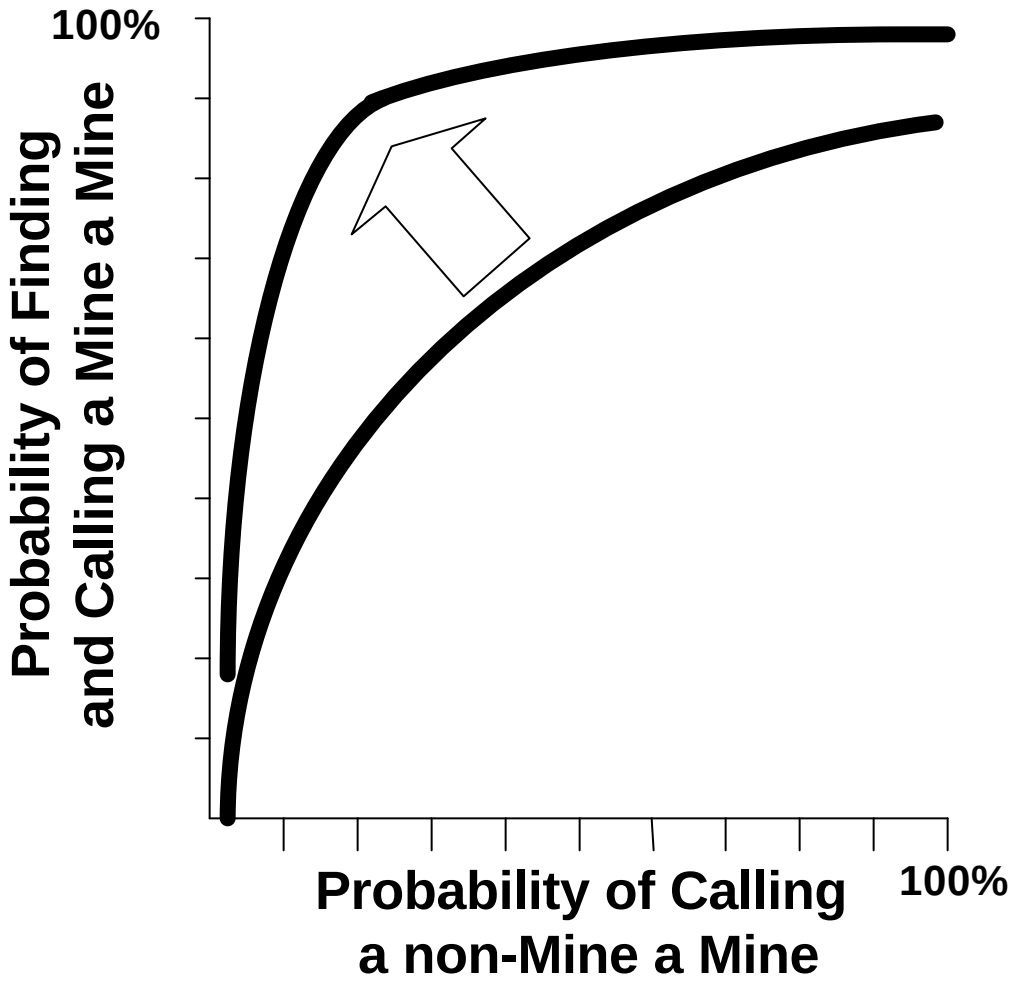
- **Improve our ability to differentiate between mines and non-mines.**

Detect ® Discriminate ® Classify ® Identify

Legacy BQS-15



Improved System Performance Needed



Detection Sensors:
- **optimize sonar parameters**
- **maximize pings on target**
- **high performance 3D CAD**
- **null steering reverb suppression**

Classification Sensors:
- **maximize # of pixels on object**
- **maximize image contrast**
- **improve recognition processing**

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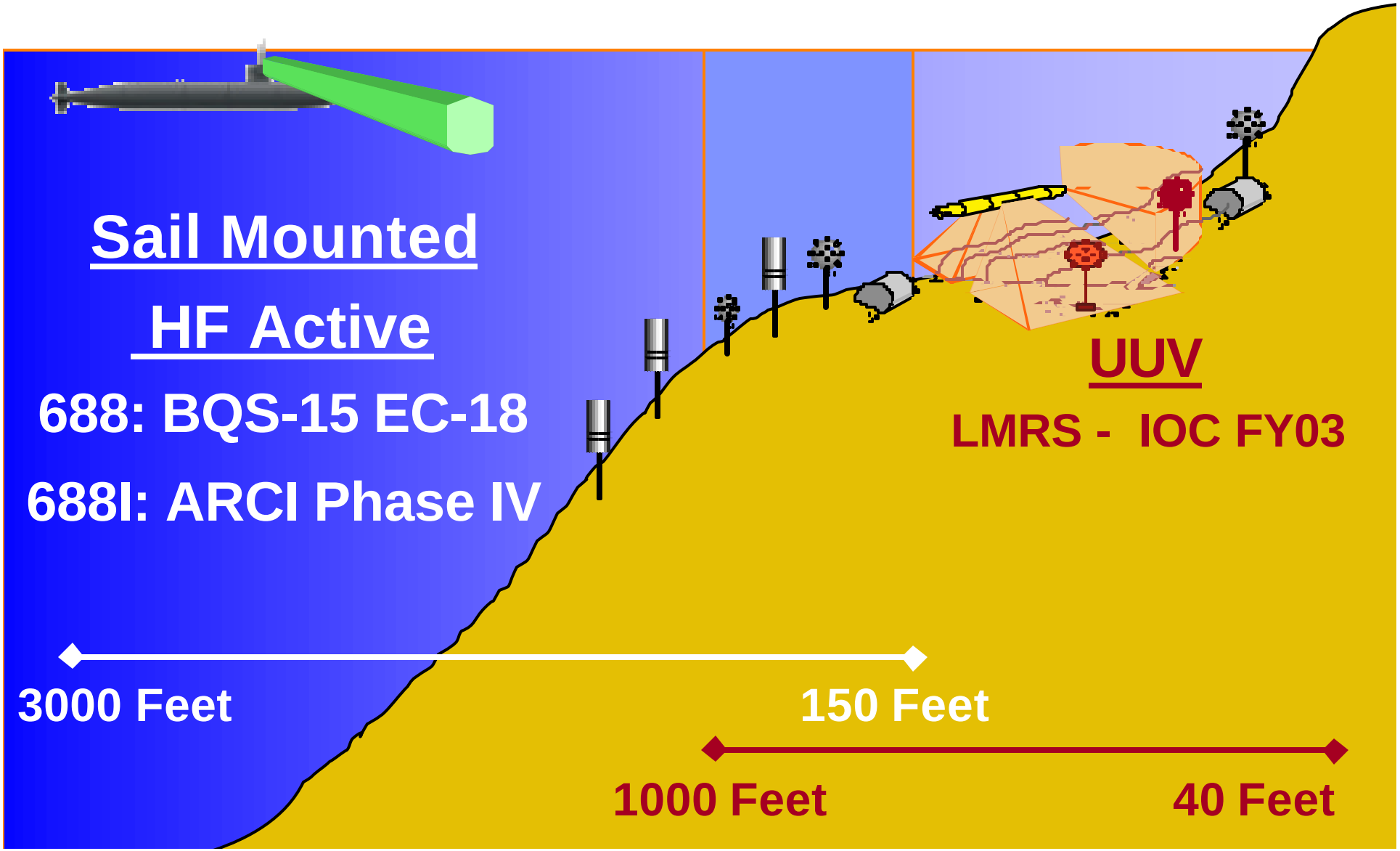
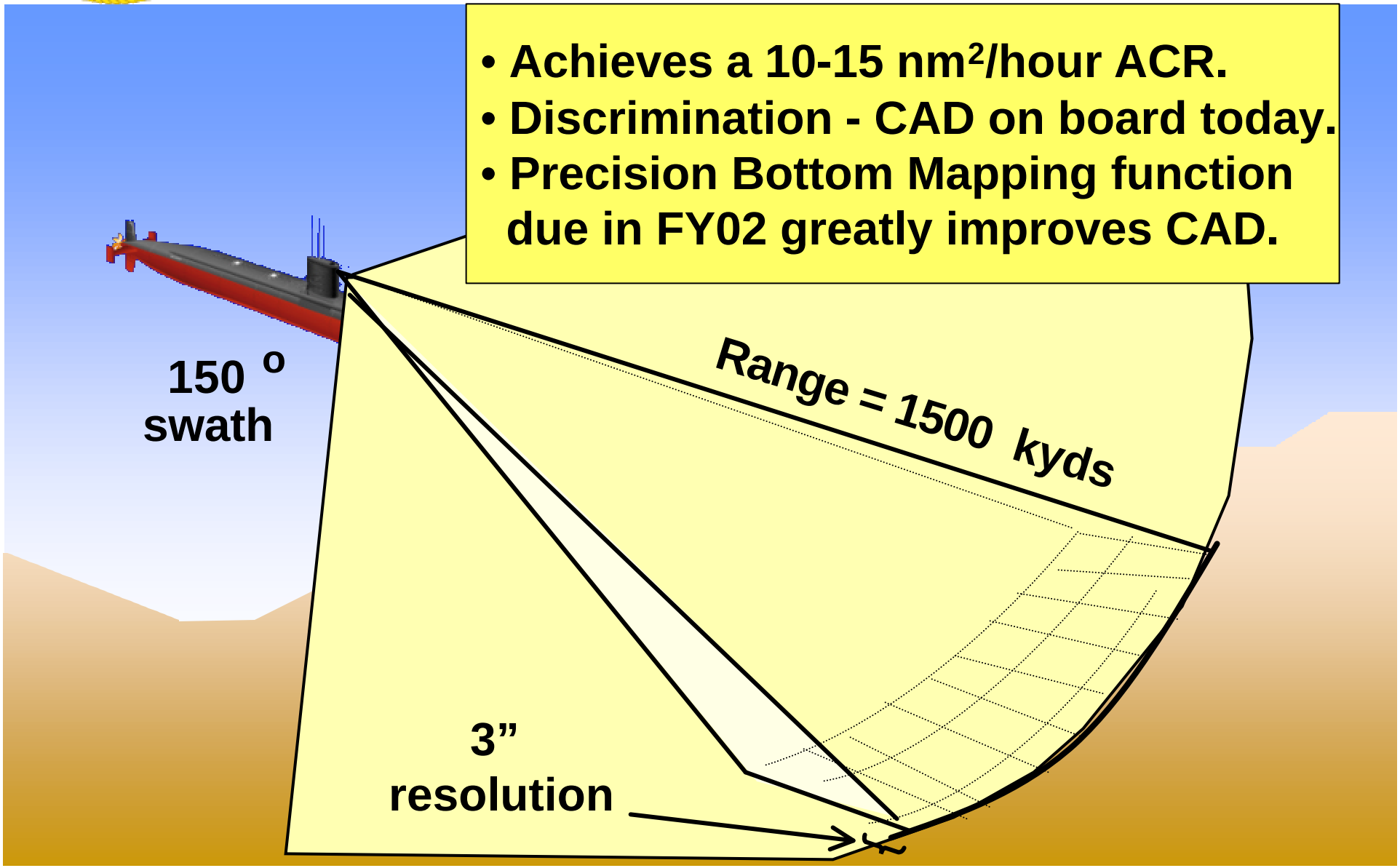
Submarine MCM Capability

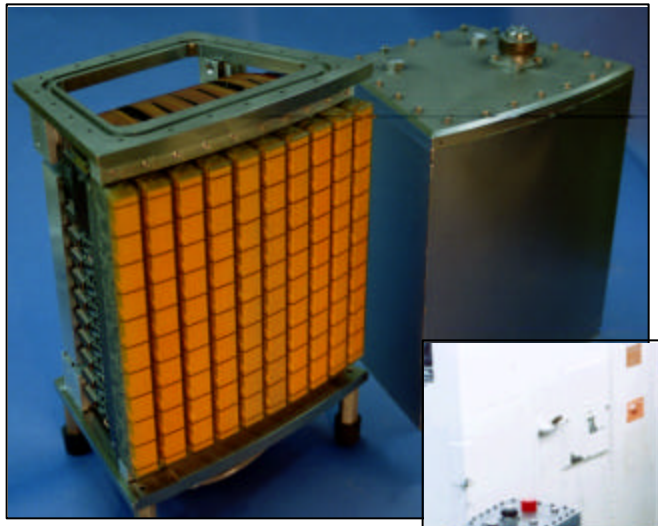


HF Submarine Sonar

- Achieves a 10-15 nm^2/hour ACR.
- Discrimination - CAD on board today.
- Precision Bottom Mapping function due in FY02 greatly improves CAD.



USS Asheville (SSN-758) EDM Installation



10x 10 elements per module

8 modules
800 channel receive array

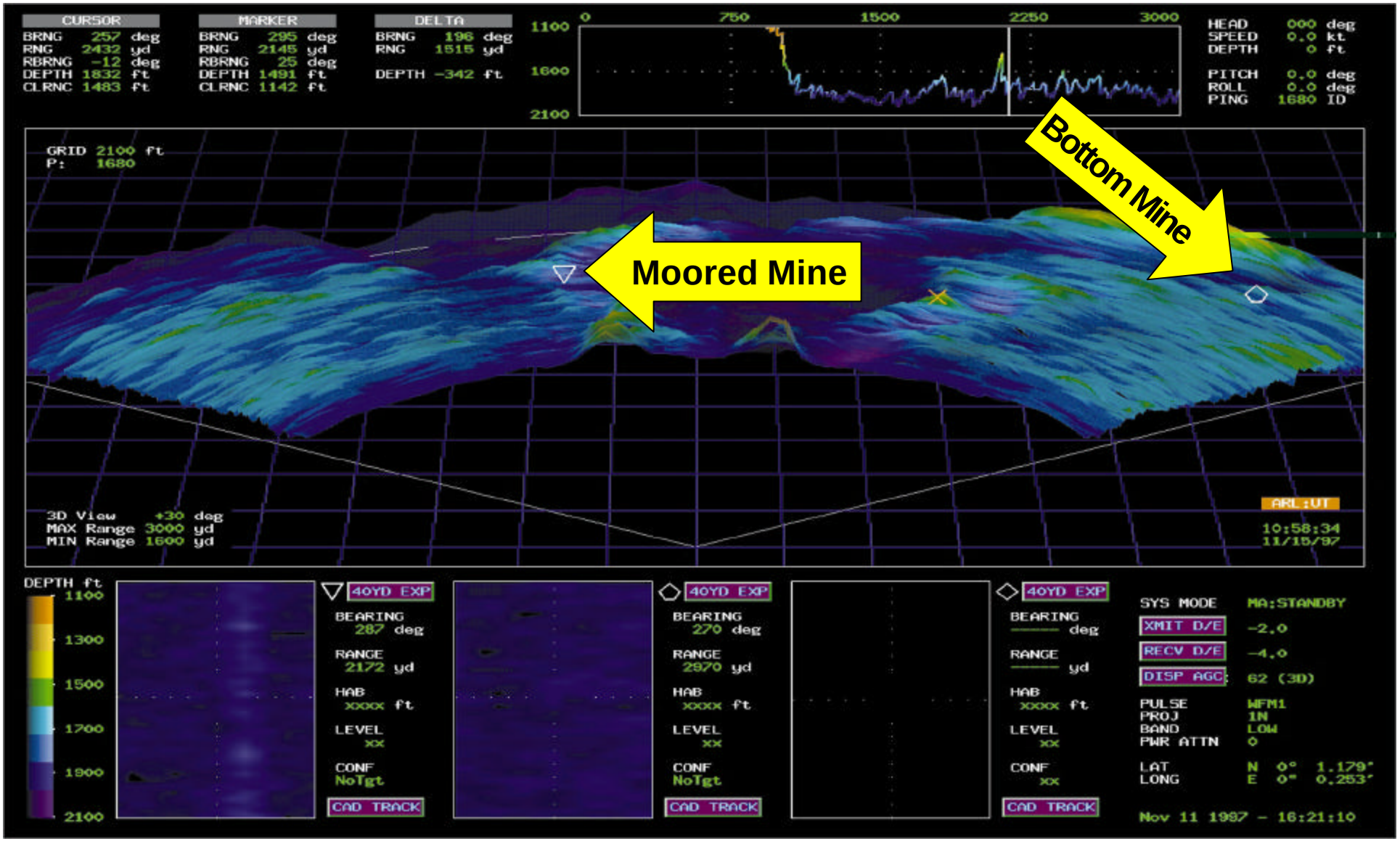
All 688I's - IOC 00

Virginia Class

- **3D CAD**
- **3D Display**
- **Terrain Profiling**

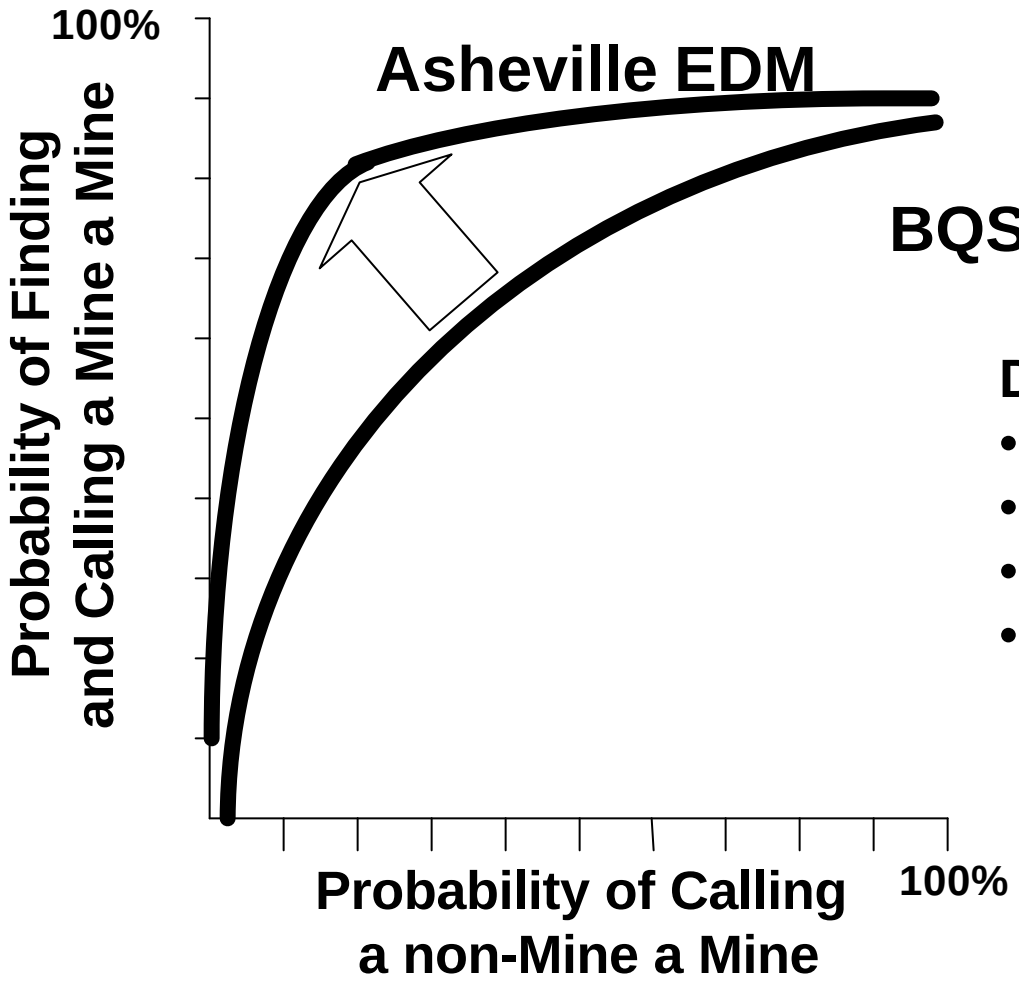
Sail Mounted

USS Asheville (SSN-758) EDM At-Sea Today



Where We Are Today!

With a 10-15 nm²/hour ACR.



Detection Sensors:

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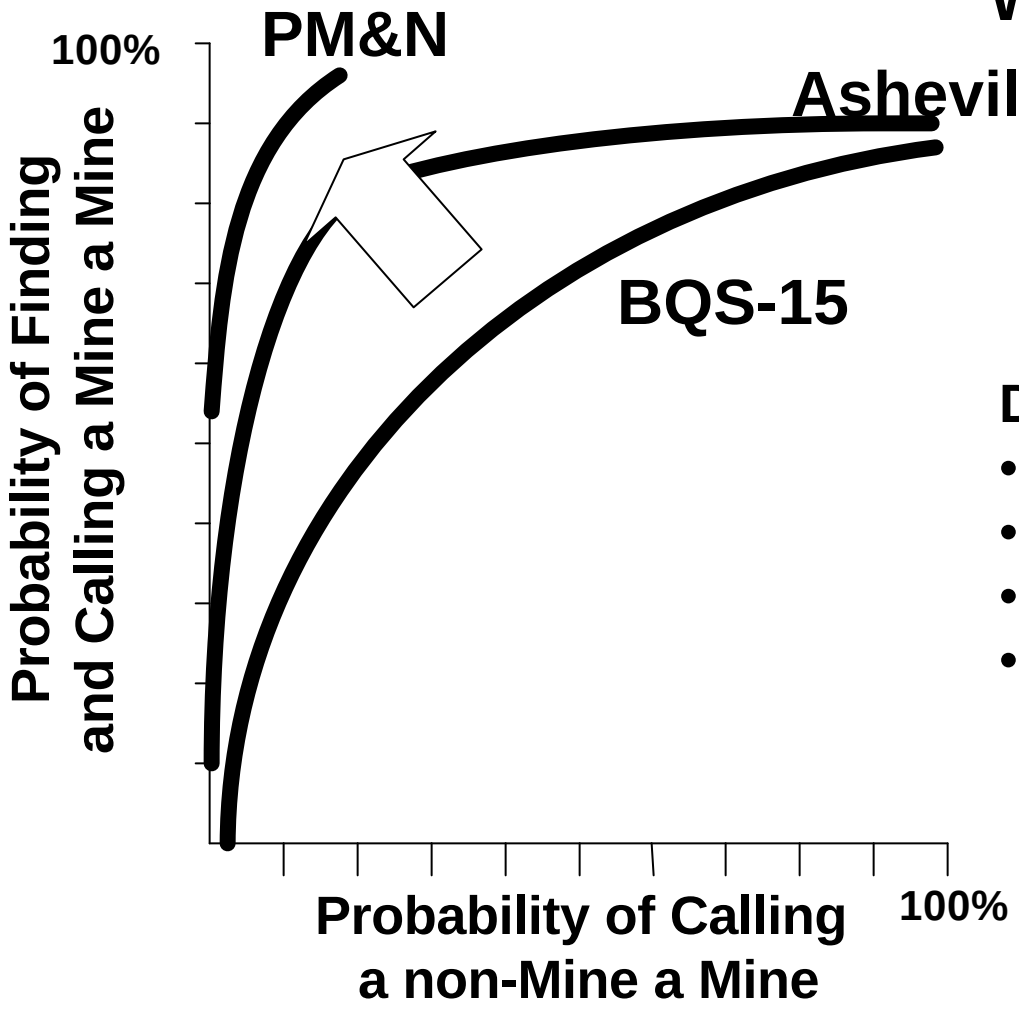
Where We Are Going!

With a 10-15 nm²/hour ACR.



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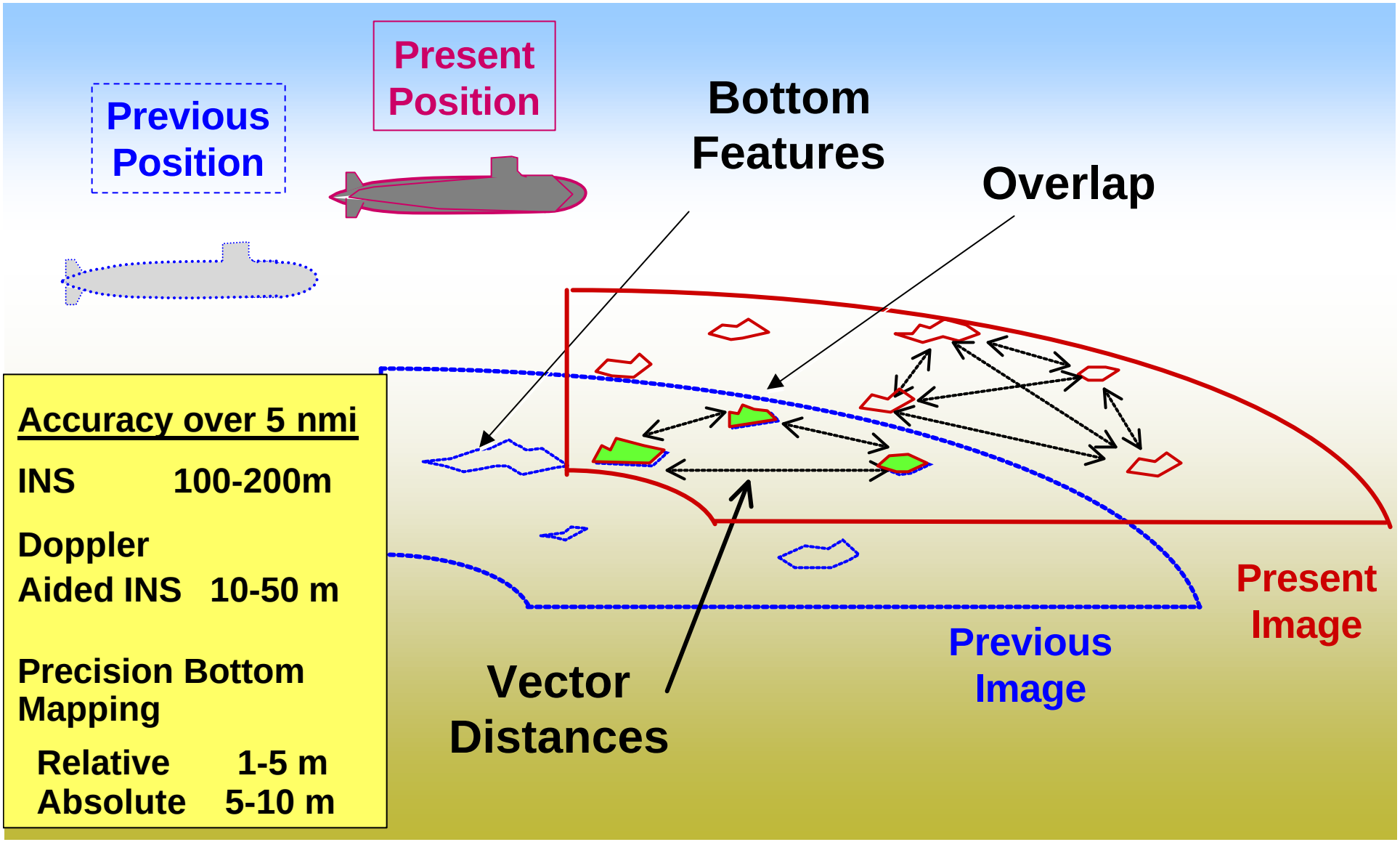
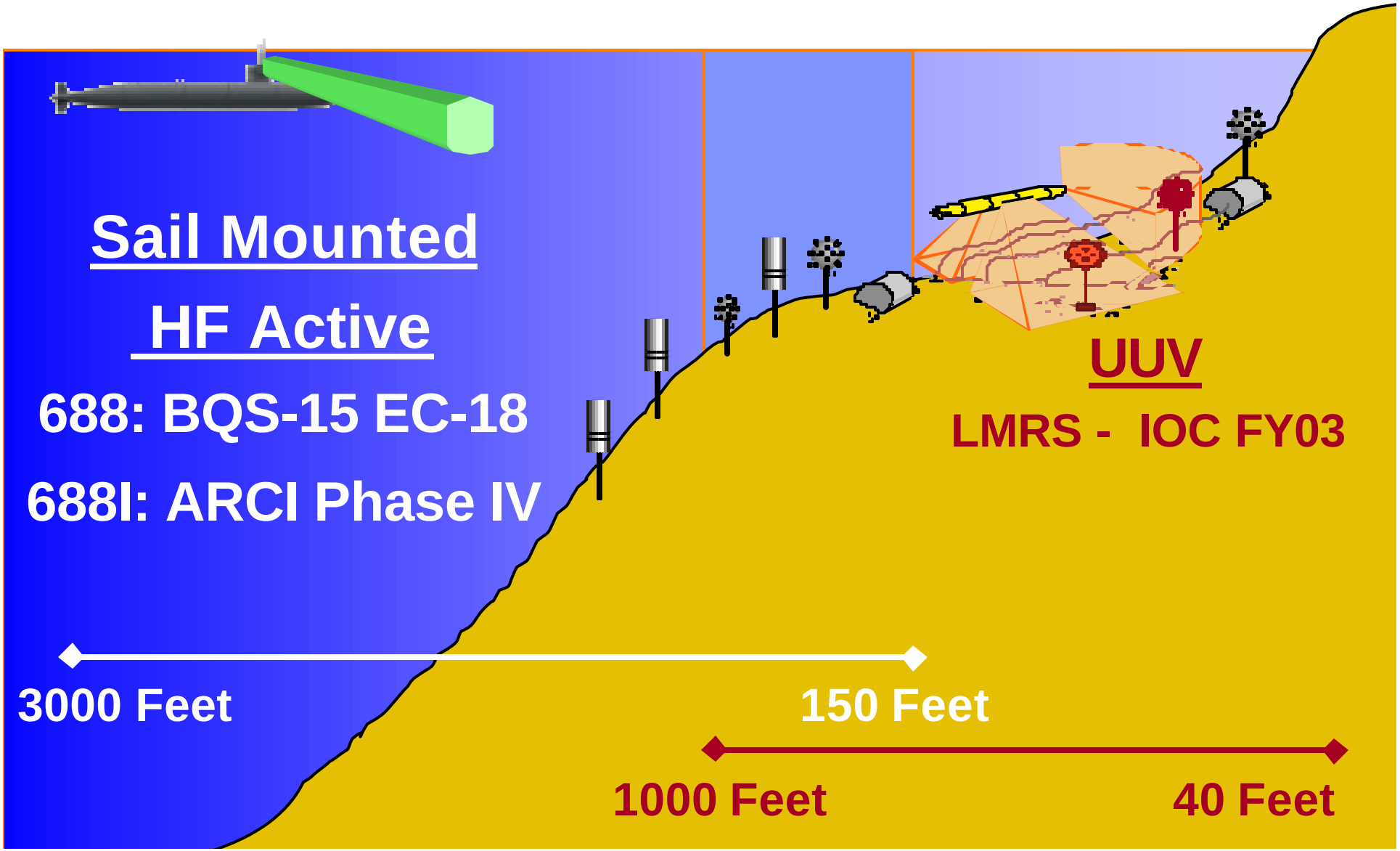
Improved Underwater Navigation

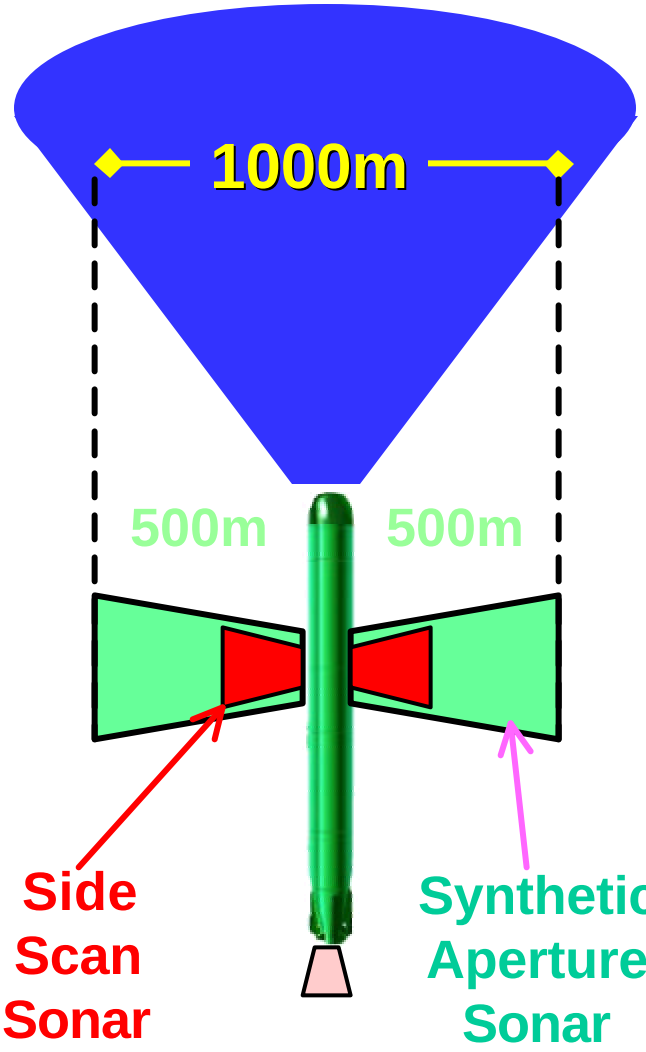


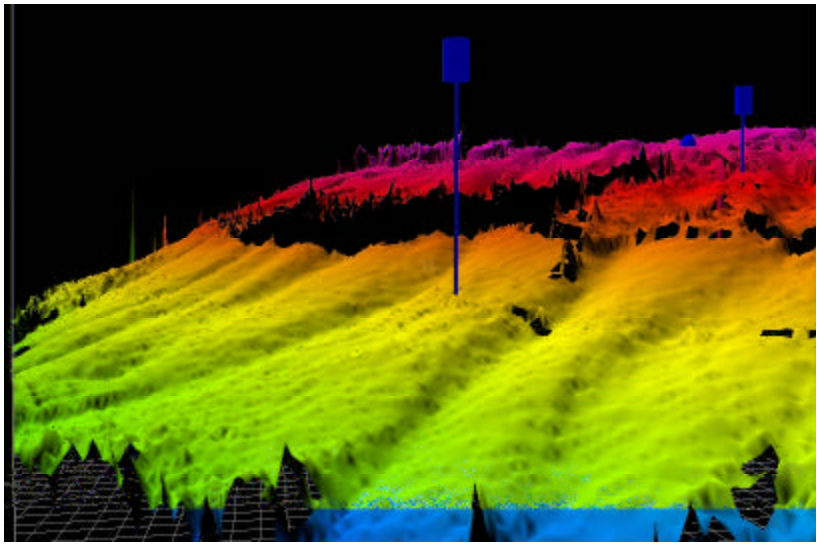
Submarine MCM Capability



Long-Term Mine Reconnaissance System (LMRS)

LMRS with PM&N and SAS

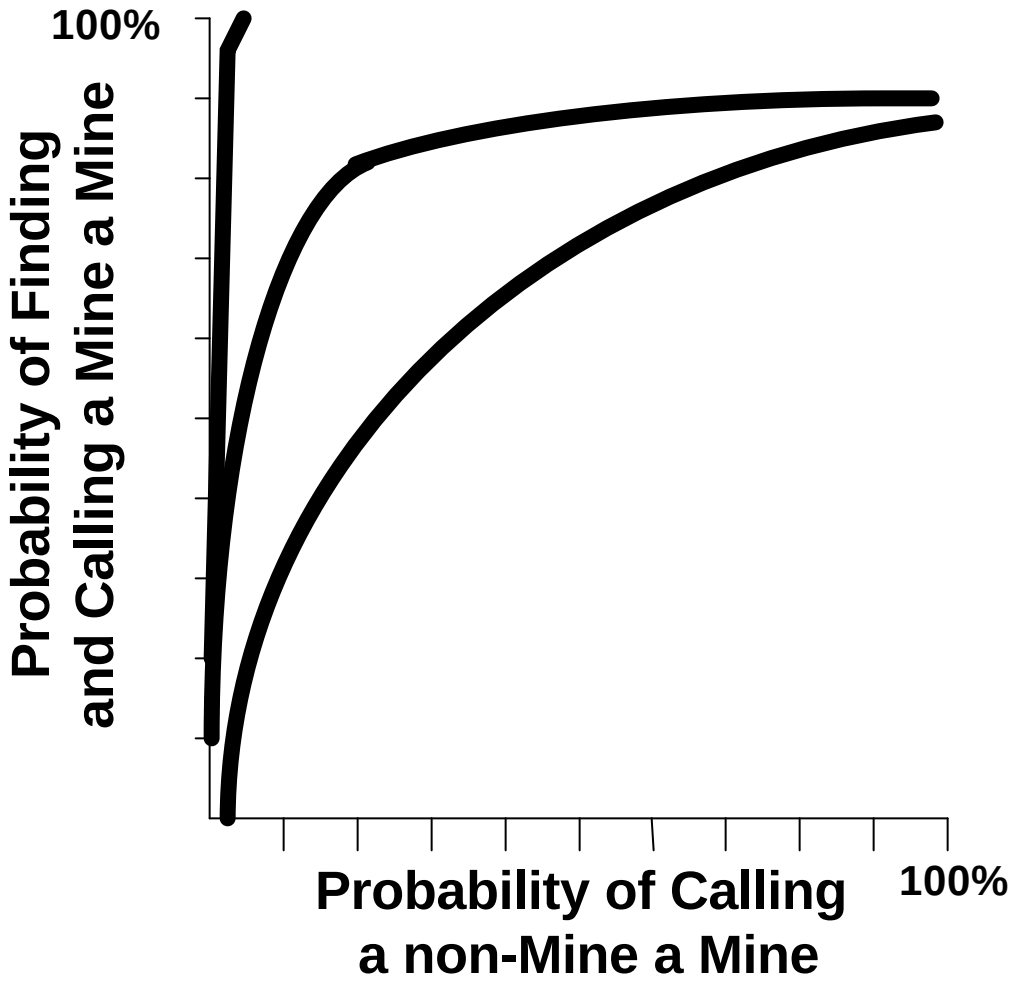




Detect
↓
Discriminate
↓
Classification

- All functions “in stride”
- 2.5 nm^2/hr ACR
- Exploit the ALS/SLS combination

An ALS and SLS Combination?



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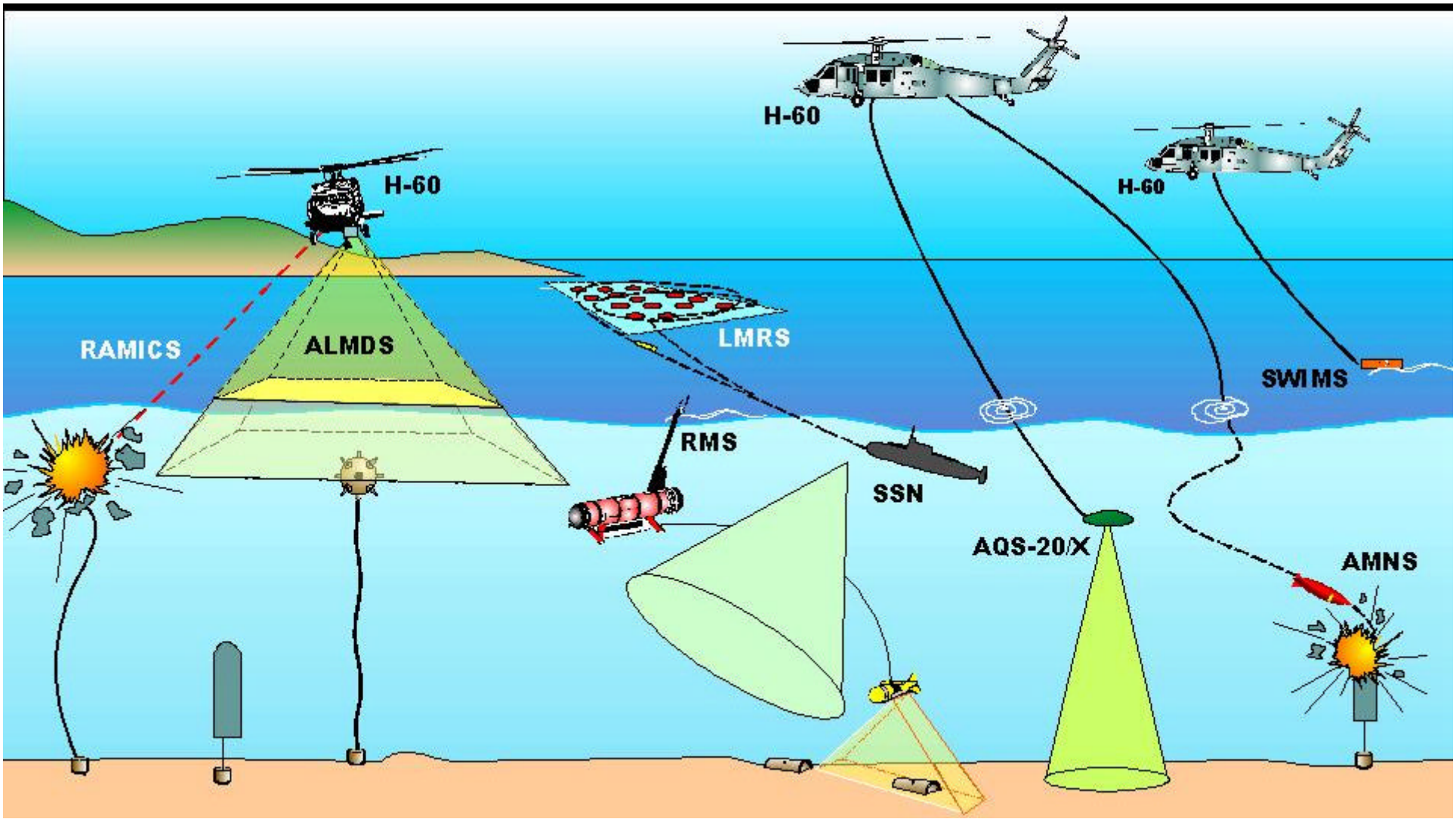
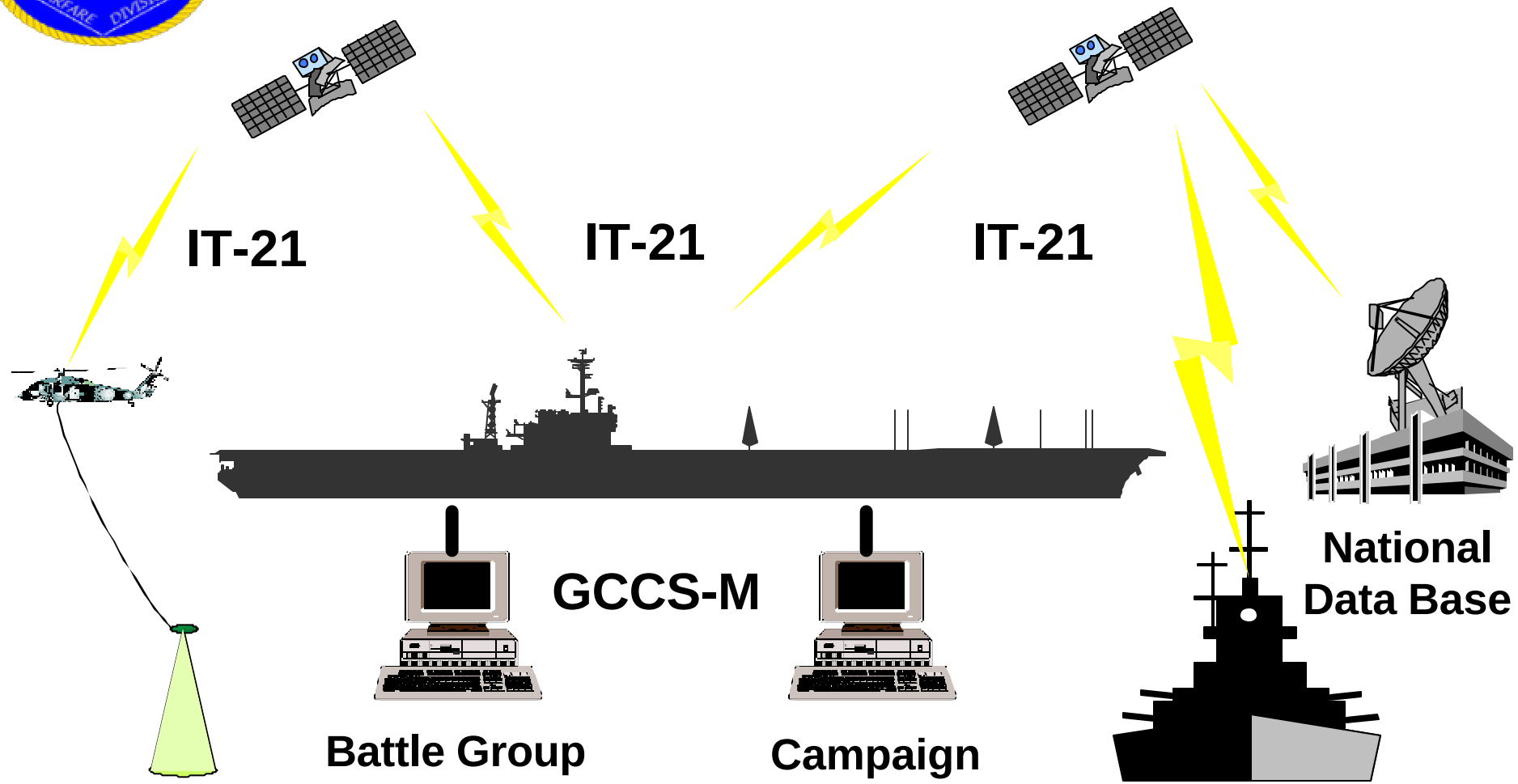
→MCM Common Operational Picture (MCM COP)

- **Summary**

Platform Centric View of Organic MCM

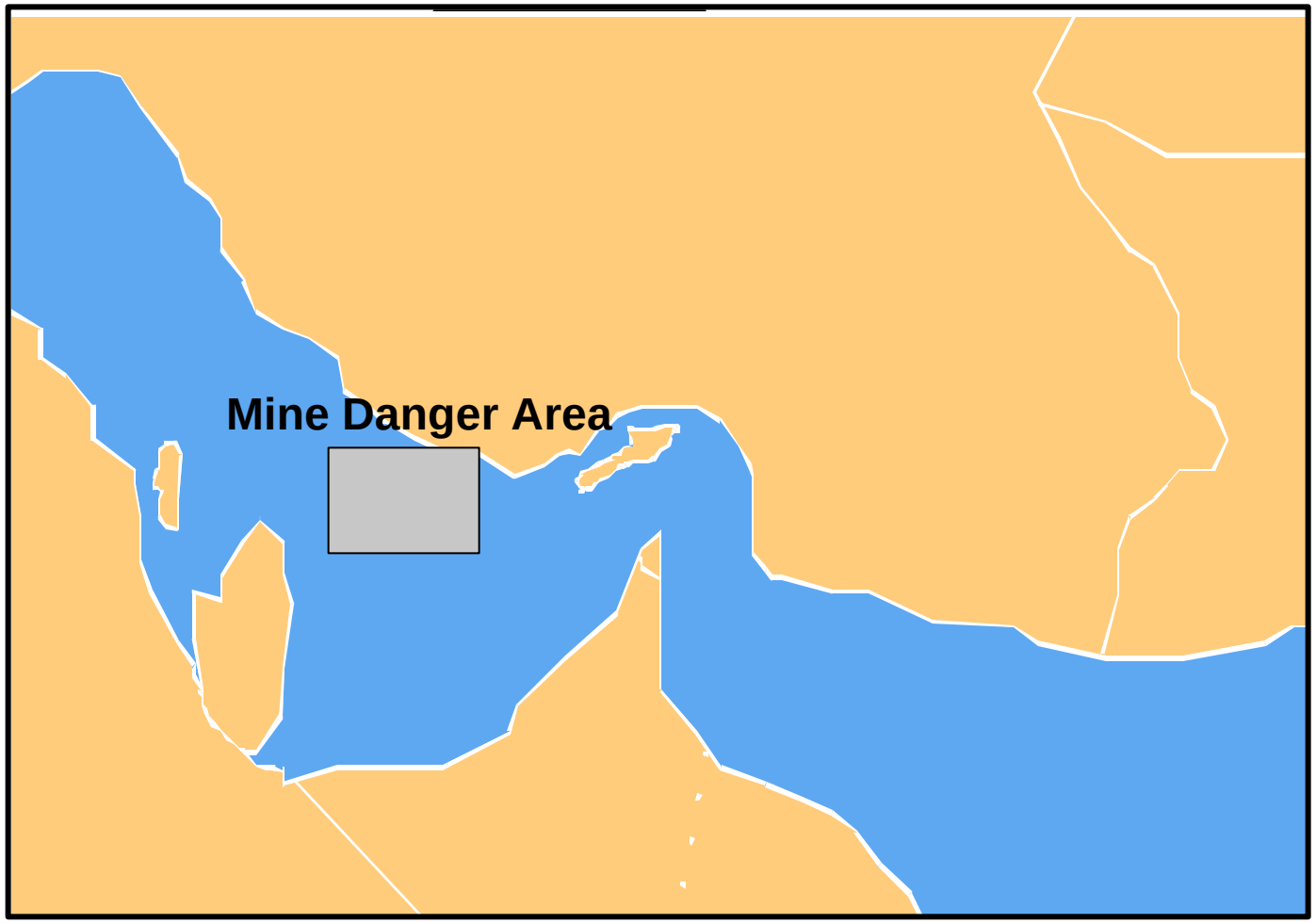


Battlegroup Centric View

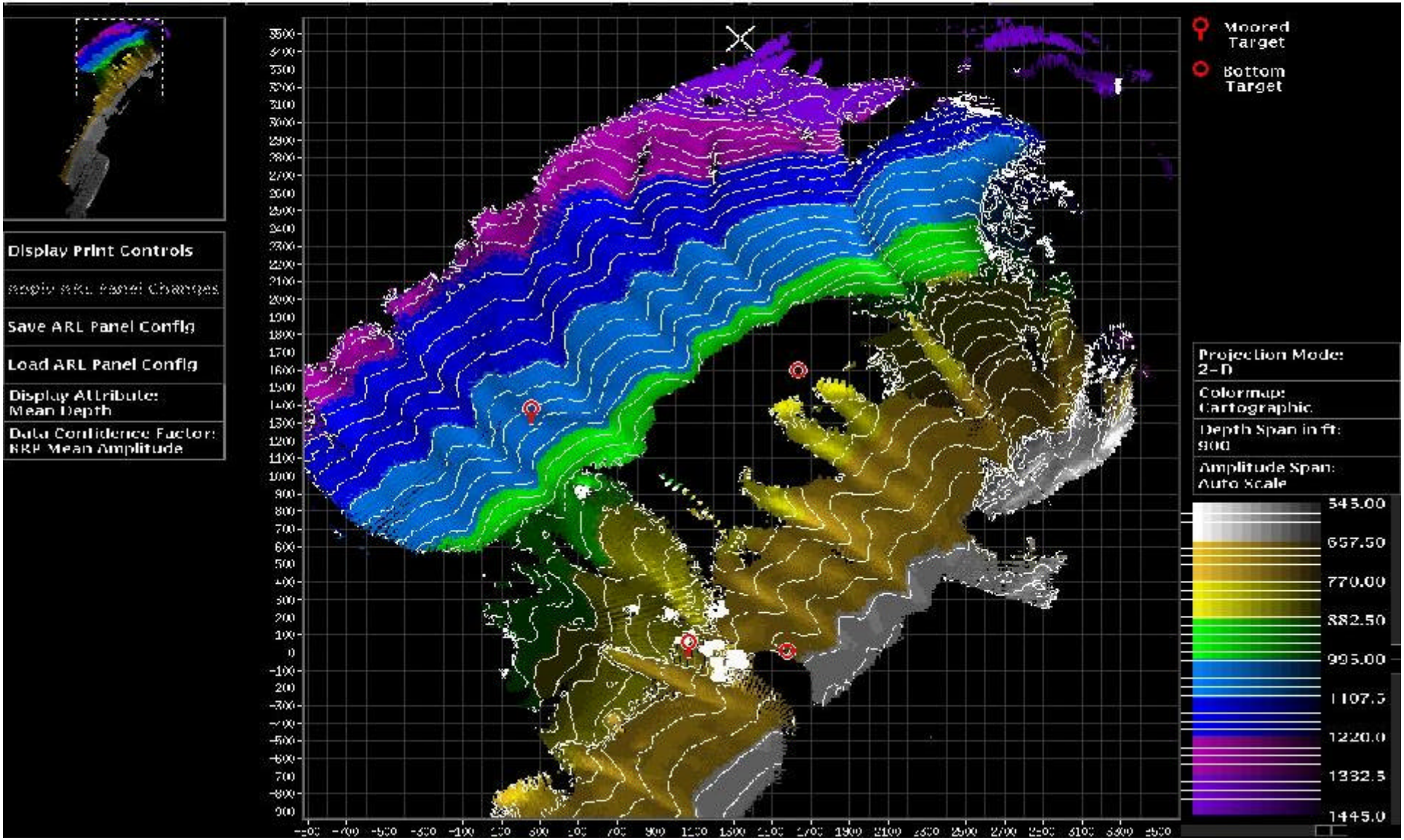


How Do We Get Here?

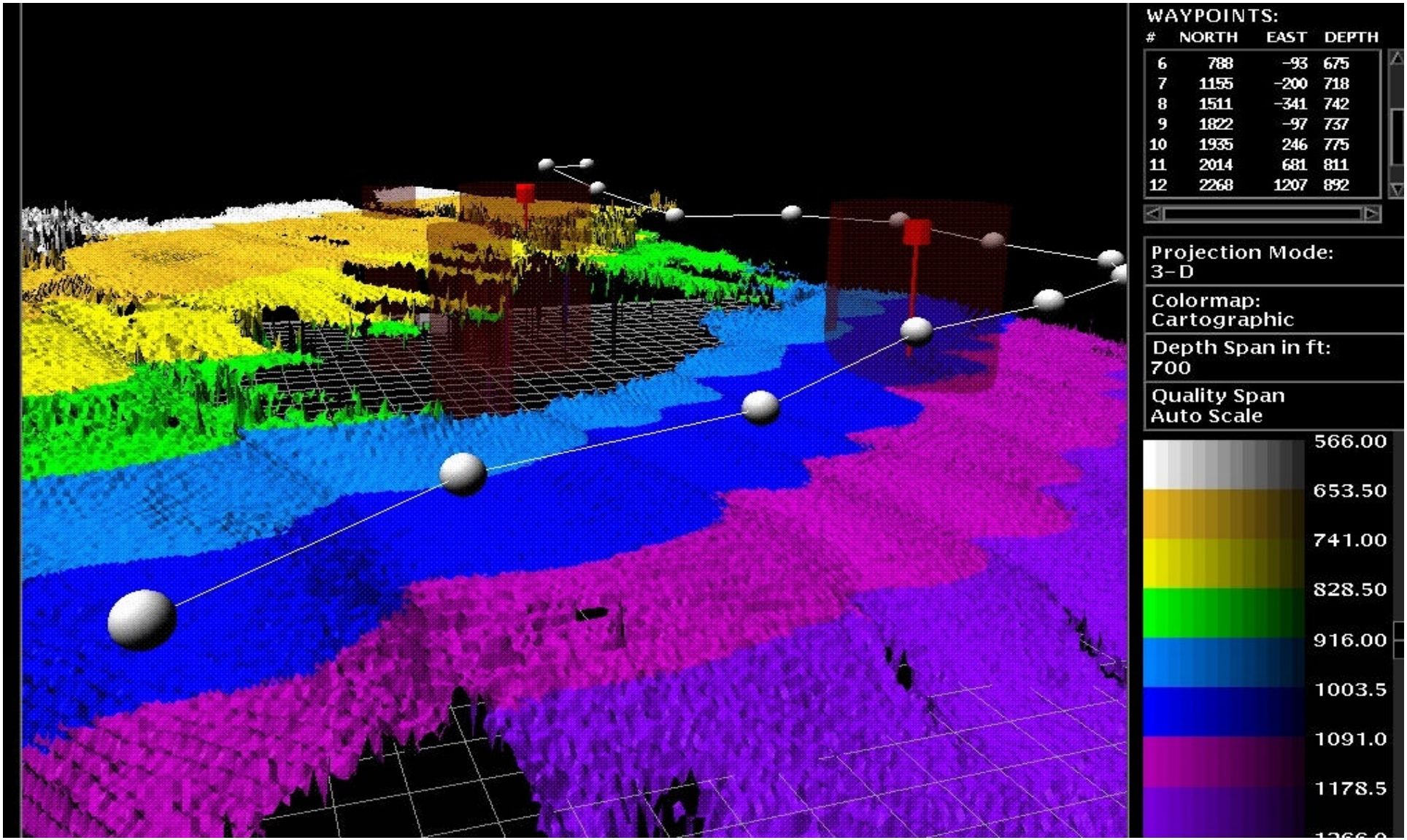
MCM COP Display
Level 1



MCM COP Display Level 2



MCM COP Display
Level 3



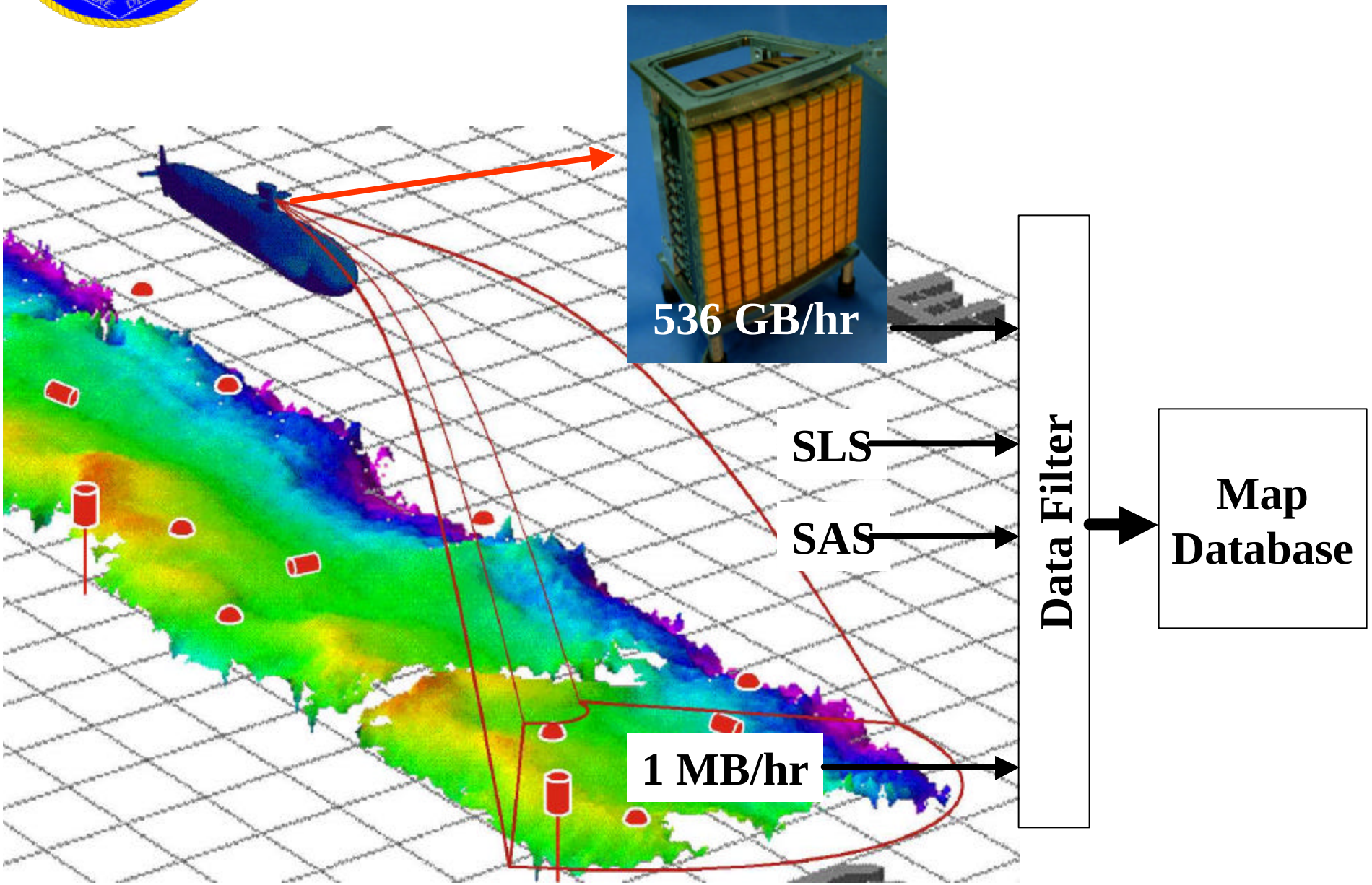
Our Proposed Solution

- **We need a common set of data standards to ensure interoperability.**

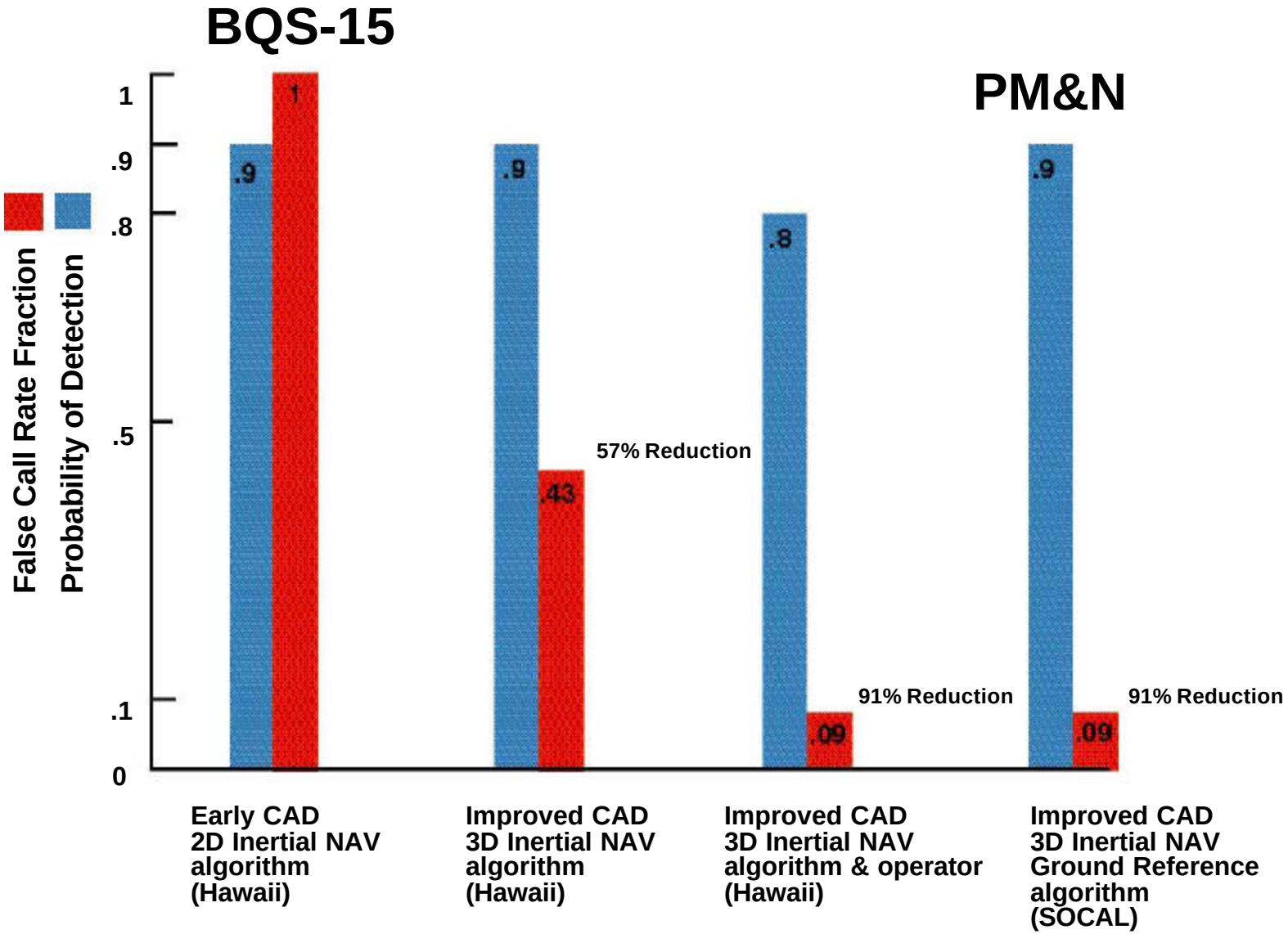
- **The Submarine Force is going forward with the production of an "Undersea Map" as the standard for data integration.**

- **A map could contain any or all of the following information:**
  - **Contact information**
  - **Environmental information**
  - **Bathymetric information**

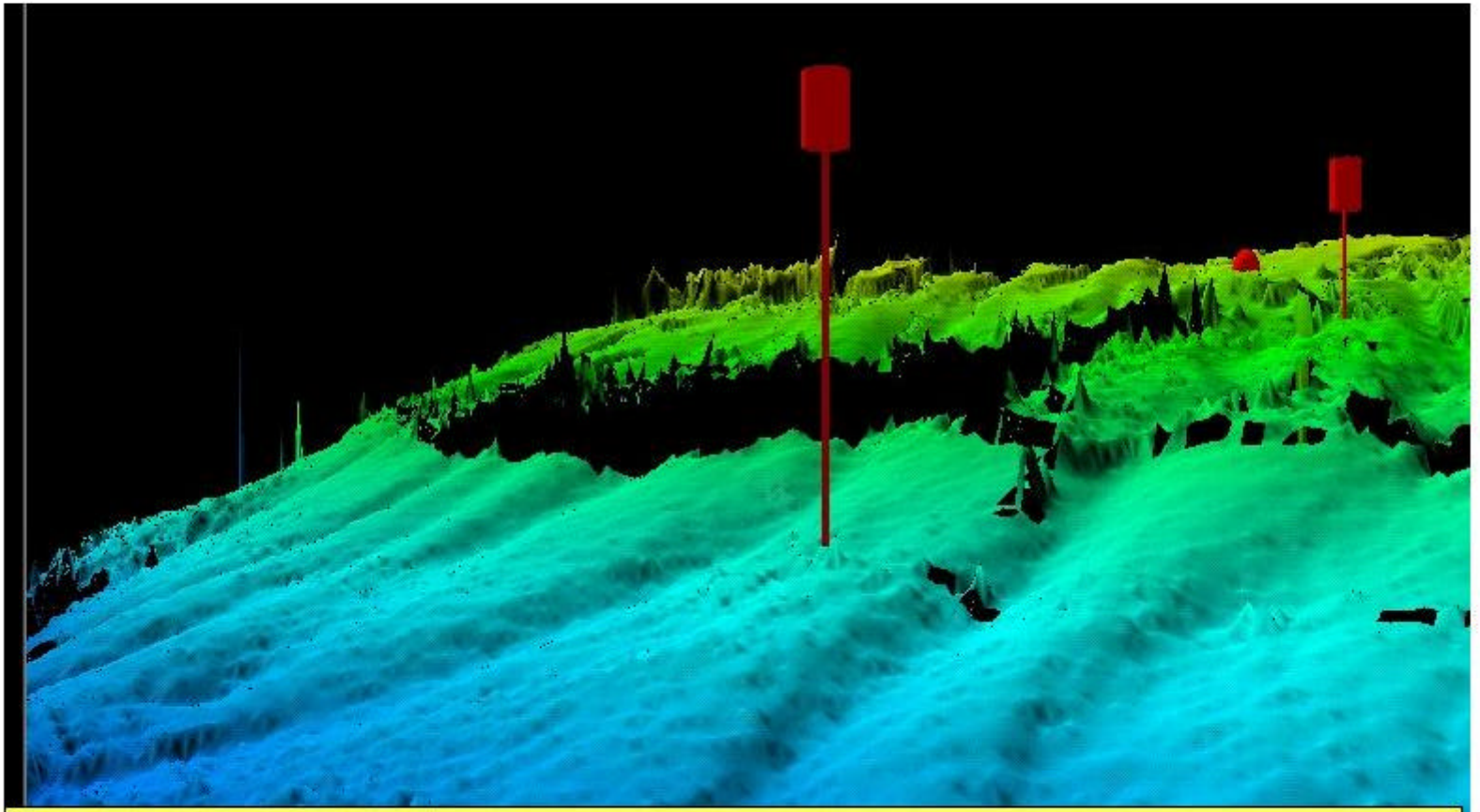
Enables Connectivity



Greatly Reduced False Call Rate



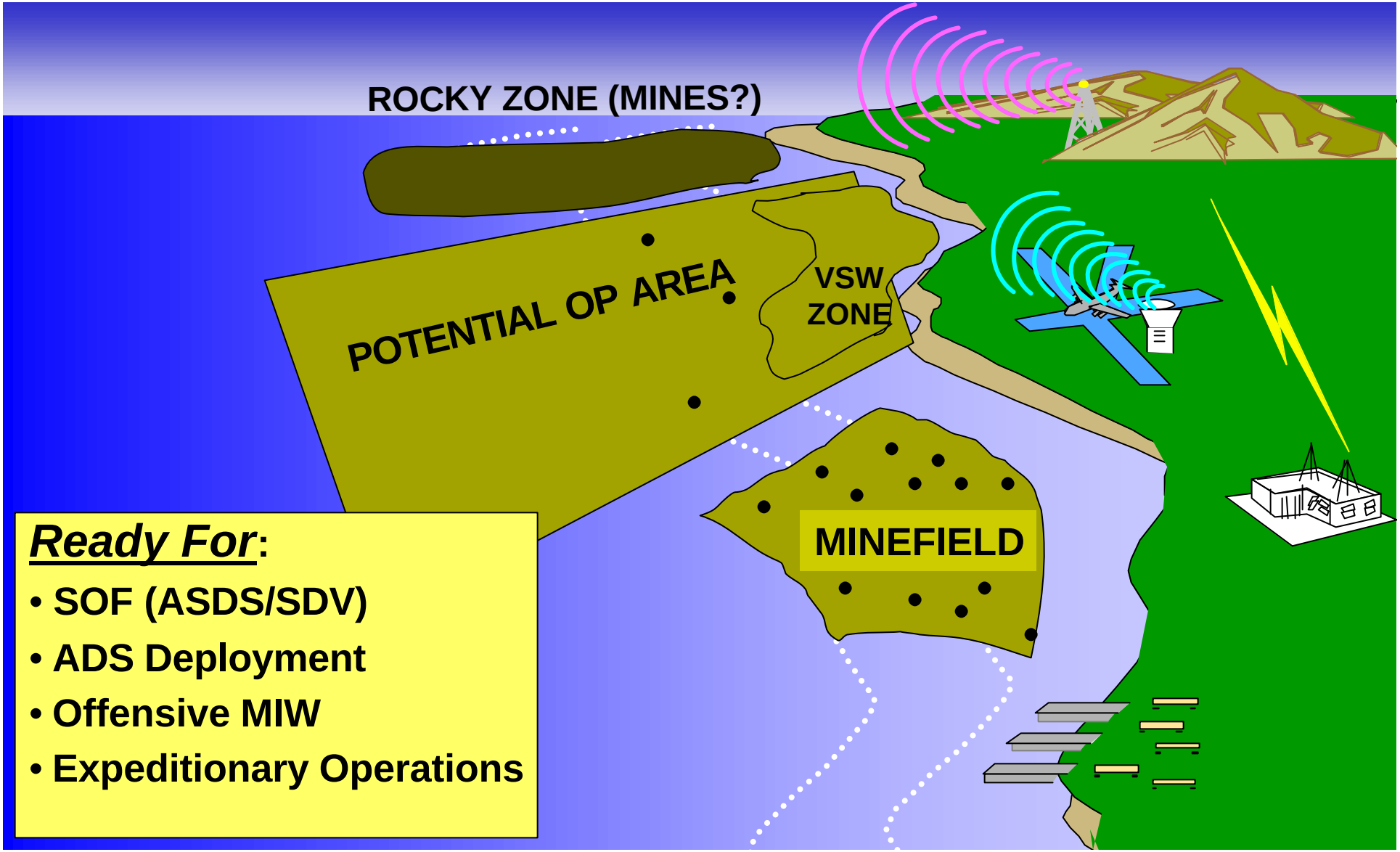
Provides More Than Just Mine Locations



Mapping Features:

- MCM Obstacle/Contact Mapping
- Precision Bathymetry
- 2D/3D Map Visualization
- Precision Navigation
- Exportable Products

For Uses Beyond MCM



Ready For:

- **SOF (ASDS/SDV)**
- **ADS Deployment**
- **Offensive MIW**
- **Expeditionary Operations**

How to Reduce the Timeline?

- **Maximize the area coverage rate <u>without</u> sacrificing the ability to differentiate between a mine and a non-mine (increase the speed of advance, swath size or both).**

- **Improve our ability to differentiate between mines and non-mines.**

Detect ® Discriminate ® Classify ® Identify

Summary

- **Precision Mapping & Navigation will greatly reduce the False Call Rate for ALS.**
- **Synthetic Aperture Sonar for LMRS could provide “in stride” classification.**
- **Mapping Database and Data Standards will enable connectivity across the fleet.**